

S h e l l f i s h a n d B e n t h o s C o m m i t t e e

By A.C. SIMPSON

1967

MOLLUSCS AND BENTHOS

Belgium

(E. Leloup)

Ostrea edulis

Observations on oysters at Ostend have been continued.

Mytilus edulis

Observations on the incidence of Mytilicola have been continued.

Finland

(S.G. Segerstråle)

The reproduction of marine lamellibranchs was investigated.

Germany

(K. Tiews)

Mytilus edulis

Routine investigations on the growth and quality of wild and cultured mussels and on their infection rate with Mytilicola intestinalis have been continued at the 'Institut für Küsten- und Binnenfischerei'.

Ostrea edulis

Fattening experiments in the Wadden Sea around the Isle of Sylt were carried out.

Benthos

Another 32 samples of benthos were taken by the 'Institut für Küsten- und Binnenfischerei' along the coast of East Friesland in order to study if there is any relationship between the distribution of sole and its benthic food.

Also the Biological Station Heligoland continued its sampling of benthic communities on special stations in the North Sea to study changes in species distribution and dynamic aspects of the echo-system.

The 'Institut für Meeresforschung' in Bremerhaven has continued its study on the distribution of micro-benthos in the southern North Sea with special emphasis on nematodes, fungi and bacteria.

Ireland

(F.A. Gibson)

Ostrea edulis

Studies of the oyster stocks in the public fisheries at Tralee Bay and Clarinbridge continued during the period. A number of private oyster beds were examined. An important observation made and applicable to all oyster stocks examined, was a particularly successful and heavy spat fall in 1967.

Mytilus edulis

Intensive studies and surveys of mussel stocks were undertaken in 1967. Methods of assisted propagation were examined.

Netherlands

(P. Korringa)

Oysters

Again, the oystermen in Zeeland had to rely almost exclusively on rearing imported stock to marketable size and condition. Some 15 millions of Brittany oysters were scattered on the plots of the Yerseke Bank in the spring of 1967. Growth and fattening came up to expectations and mortality figures were surprisingly low. It is clear, that a modest oyster population leads to better results than overcrowded conditions.

Apart from the Brittany oysters some flat oysters from Ireland and from natural beds in the Adriatic Sea have been planted on the plots of the Yerseke Bank, but again the Adriatic oysters showed high mortality figures and a rather poor growth. Evidently, conditions in the Oosterschelde do not appeal to them.

The summer of 1967 was much better than the summer of the preceding years, and water temperature rose well above $17\frac{1}{2}^{\circ}\text{C}$, the critical level for development of oyster larvae. June was quite cold, but in the first half of July water temperature in the Oosterschelde was on an average $19\frac{1}{2}^{\circ}\text{C}$, in the second half even $20\frac{1}{2}^{\circ}\text{C}$; the first half of August gave an average of 20°C , the second half of 19°C . It is not surprising, therefore, that the 3000m^3 of mussel shells scattered as collectors caught a good set of spat. In autumn a rough estimate led to a figure of 50 millions baby oysters. It is the first set of commercial importance since the disastrous winter 1962-1963, and it is hoped that this set will form the basis of a new stock of Dutch oysters, together with the scanty survivors of the 1962-1963 disaster.

It is interesting to note that the prolonged high water temperatures did not lead to a serious outbreak of shell disease in the oysters. A very limited percentage of the young oysters only showed the early symptoms of shell disease in autumn.

On some higher grounds of the Yerseke Bank Portuguese oysters have been relaid for growth and fattening. Growth was excellent and high water temperatures in July and August led to wholesale spawning. Therefore condition and flavour left nothing to be desired later in the year.

Again a high run-off from the big rivers led to low salinities in the winter of 1966-1967. The salinity pattern in the Oosterschelde was closely followed and the oystermen were duly informed about salinities to be expected. This made it possible for them to prevent losses among the oysters in the storage ponds by switching over to re-circulation of the water and by supplying salt whenever necessary.

Mytilus edulis

Low salinities early in 1967 led to a considerable delay in the spring development of the phyto-plankton. Therefore growth and condition of the mussels were in 1967 below the average.

The preparations for the construction of a field-laboratory and experimental plant for cleansing and storage of mussels on the south coast of the Isle of Texel were completed in 1967, and building will start in the first months of 1968.

Norway

(K.R. Gundersen)

During 1961-1967 the survey of the coastal areas of Norway for stocks of edible bivalvae has been completed, and a report is in press.

Chlamys islandica

Beds of Chlamys islandica located in northern Norway in 1961-1963 were again inspected in 1967. Photographs and counts made by scuba divers indicated maximum densities of 60 scallops per square metre in limited areas. Dense populations of Asterias rubens (100/m²) were seen feeding on the scallops in some places.

Mytilus edulis

The experiments with mussel culture from rafts were continued. Various types of collectors have been tried. In some localities, 80% of the mussels attained a length of 45 mm or more, maximum 75 mm. In August, the amount of boiled meat was up to 40% of the total weight.

In the Oslo Fjord, plates of foam plastics were suspended from a raft at regular intervals during May-August. Maximum settlement took place in the period June 4-25, some settlement also occurred during the second half of July.

Unusually high concentrations of paralytic shellfish poison (PSP) (maximum 13,000 mouse units) were observed in the Trondheimsfjord during June. No PSP has been observed in this fjord since 1964. In the Oslo Fjord, only traces of PSP were found during June.

Poland

(L. Zmudziński)

Benthos

In the late spring (17th May - 29th June) samples of the bottom fauna were made at 200 stations distributed all over the area of the southern Baltic south of 56°N and east of 12°E.

In the summer (28th July - 21st August) samples of the bottom fauna were taken at 25 stations in the southern Baltic south of 56°N and east of 14°E.

In the autumn (8th November - 11th December) the 25 stations worked in the summer were repeated.

At the 250 stations there were taken in all 760 samples of bottom fauna by the Van Veen bottom sampler, and 133 samples of the bottom sediment. At most of the stations the bottom temperature, bottom salinity and oxygen content of the water were measured.

The biology and fenology of reproduction of some of the main species of the bottom macro-fauna have been investigated, on the basis of the material collected in 1966-1967 as well as using experimental plates immersed in the water at the port of Władysławowo.

Cephalopoda

Cephalopods living in W. African Shelf waters were investigated. The research covered the species composition, the length and weight of some individuals and the depth and geographic distribution of the different species. Material serving for these investigations was collected during the cruise of the research ship M.T. "Wieczno" to the W. African Shelf waters between 7°30'N and 23°00'N, from 12th June to 5th September, 1967. The Decapods collected were: Loligo, Ilex, Todarodas, Todaropsis, Allotheutis and Sepiae.

Portugal

(H. Vilela)

Crassostrea angulata

Routine work on oyster culture and the sanitary control of oysters have continued.

Sweden

(B.I. Dybern)

Ostrea edulis

A survey of the small Swedish fishery for oysters has been started.

United Kingdom

1. England & Wales

(A.C. Simpson)

Ostrea edulis

Experiments related to artificial rearing have shown that growth of larvae in polypropylene containers is not so good as in polythene or glass. Larvae grew better and a larger proportion reached the eyed stage when grown in deep vessels (220 cm) compared with those of 140 or 80 cm and when fed a mixture of food organisms rather than monocultures. The experimental oyster hatchery had its first full year of operation and some 70,000 spat were successfully singled from the tides.

Small Norwegian poll-grown oysters were successfully grown on trays at several sites in east England. A substantial programme of investigation into the factors affecting growth and survival of larvae and spat in the Fal estuary was started with a view to increasing production of seed oysters in the estuary.

Mytilus edulis

Investigations into the factors affecting settlement and survival of mussel spat are continuing and methods are being developed to determine the abundance of the important predator Carcinis maenas. Sprinkling 10% HCl on to 1/5 m² quadrants on the intertidal zone when the tide is out brings the crabs to the surface and is proving useful in determining the numbers of very small crabs in a variety of substrates.

Cardium edule

The study of the population dynamics of the cockle stocks in Burry Inlet, South Wales, and predation on them by oystercatchers, is being continued. The 1963 year-class still dominates the population and the commercial catches, and a substantial decline in annual yield is expected after they are fished out during early 1969.

The cockle resources in the Thames area and the Wash, also dominated by the 1963 year-class, have been surveyed. A cockle dredge with hydraulic lift to the surface is being used commercially in the Thames estuary.

Mercenaria mercenaria and Venerupis spp.

These clams are being reared artificially with little difficulty and experimental layings show that they can be successfully grown on in many parts of south and east England, but growth is very slow in Scotland. Natural populations of Venerupis decussata and V. pallustris are nowhere at commercially useful levels in England or Wales.

Pecten maximus

A detailed study of the rings on the shells from many populations has been continued and a comparison of growth round England and Wales has shown a substantially lower growth-rate off Plymouth and Falmouth than elsewhere.

2. Scotland

(H.J. Thomas)

Ostrea edulis

Oyster investigations carried out from the Marine Station, Millport in 1967 included trials of suspended culture in two areas on the west coast, and a population survey of the natural beds in Loch Ryan. In the laboratory the biology of the larvae was further studied and a method of bacteria-free culture was successfully used.

Cardium edule

A further transplant experiment of cockles has been carried out at Barra. The results confirm that cockles transplanted from an area of abundance high on the shore to an area of scarcity low on the shore survive well and grow more quickly.

Mytilus edulis

Experiments have been made into the rope cultivations of mussels in two areas on the Scottish west coast. In both areas, growth-rates were improved by the cultivations and in one case (Linne Mhuirich) exceptional growth-rates were obtained. In January 1967, seven months after settlement, individual mussels had attained sizes of up to 57 mm with a mean of 43 mm. In September 1967 these mussels measured up to 75 mm with a mean of 67 mm. The meat content was high, the condition factor reaching a peak of 60.4 in May. Other measurements have been made into the suitability of different types of rope for attracting mussel settlement. Samples of mussels from Gareloch and the Firth of Forth areas, which had shown a heavy infestation in 1961 and a light one in 1966, showed that the level remained low in 1967.

Cephalopoda

Data on the commercial landings of squid have been maintained.

Benthos

Continuing the loch investigations programme, routine surveys of the plaice nursery ground in Loch Ewe were carried out in spring and autumn to monitor the adult stock and recruitment of benthos. Experimental work has been concerned with the effects of nutrient enrichment of the water on one of the main fish-food species, the bivalve Tellina tenuis. This species was kept in tanks with three levels of daily enrichment by nitrate and phosphate, plus a control. The results showed that the lowest rate of enrichment, when the added nutrients were utilised within six hours, produced optimum condition for bivalve growth and reproduction. Higher levels produced rapid growth of large green algae on the tank walls.

Regular examinations are being made of the bottom of an artificial marine pond constructed for fish rearing, and the process of colonisation by natural benthos is being followed.

In connection with a study of the ecology of exposed sandy bays on the north coast of Scotland, a number of intertidal surveys were made. Three beaches were sampled for macro-fauna, meio-fauna, soil, salinity and, at low water, for chlorophyll and carbon. Several other areas were examined in less detail. The fauna was sparse, with molluscs almost completely absent, and only the isopod Eurydice pulchra and the polychaete Nerine cirratulus common.

CRUSTACEA

Denmark

Greenland

(E. Smidt)

Pandalus borealis

Routine trawling experiments were undertaken in Godthåb district in the fjords and coastal area from mid-February to mid-April, and in December. The catches were generally large (from 30 to 275 kg per hour trawled), but the prawns were mostly small. Besides, echo-soundings were made in offshore water near Godthåb with the purpose of finding new trawling grounds for the industry.

In November trawling experiments were made in some fjords in the southernmost part of West Greenland (Julianehåb district), especially in deep water (abt. 600 m) in Bredefjord. In accordance with previous investigations only very few specimens of prawns were caught in spite of favourable trawling conditions (even, soft bottom) and warm bottom water (3.9°C). It therefore seems, from these and other experiments, that Pandalus has its depth limit between 500 and 600 m in Greenland waters.

Chionoecetes opilio (Greenland crab)

Experiments with a crab trawl have been continued in 1967 in fjords and coastal water in Godthåb district in January to April and in December. Relatively good catches were made in Ameralik Fjord and in the coastal area (normally 400-600 individuals per hour trawled, many of them large enough for industrial use), but in the coastal area the fishery was troubled by large quantities of seaweeds lying on the bottom. In the Disko Bay a few trawling experiments were made in August with very poor result.

Finland

(S.G. Segerstråle)

Crangon crangon

Studies of the biology of Crangon crangon were made by A. Petäjä and on the reproduction of marine lamellibranchs by J. Lassig.

Germany

(K. Tiews)

Crangon crangon

The investigations of the 'Institut für Küsten- und Binnenfischerei' to assess the shares of undersized protected fish in the catch of the German shrimp fishery and the fluctuations in the abundance of fish species found on the shrimp fishing grounds were continued. A total of 407 samples of unsorted catch of the shrimp fishery were collected in Büsum, Cuxhaven, Neuharlingersiel and Dornumersiel, and analysed as to their species and length composition.

Tagging experiments were continued during the year with the tagging of 7,400 shrimps with coloured plastic tags attached by the silver ring method, and investigations on the distribution of shrimp larvae along the German coast were continued.

Investigations on the biology and distribution of Crangon crangon in the Western Baltic, carried out by the 'Institut für Meereskunde' of the Kiel University, were completed.

Pandalus sp.

40 samples of deep-sea prawn catches made by German fishing cutters in the Farm Deep area from April to September were analysed as to their species and length composition at the 'Institut für Küsten- und Binnenfischerei'.

Homarus vulgaris

Rearing and crossing experiments with lobsters of different origin have been carried out by the Biological Station Heligoland as well as stock assessment work on the lobster population of Heligoland.

Ireland

(F.A. Gibson)

Homarus vulgaris

Catch and fishing effort in relationship to fishing gears were studied. A preliminary examination of the fundamental economics of the lobster fishery was undertaken.

Palinurus vulgaris

With the aid of 3 university bursars, approximately 7,000 crawfish were measured, sexed and otherwise examined.

Netherlands

(P. Korringa)

Crangon crangon

The 1967 shrimp research in the Netherlands focussed on three main objects:

1. The protection of undersized shrimps. Under the influence of frequent information from the Fisheries Institute the landings of undersized shrimps declined year after year. The positive effect of protection of small shrimps on the landings of consumption shrimps and thereby on the financial outcome of the fishery could be demonstrated.
2. Protection of undersized flatfish. The problem of the destruction of large numbers of juvenile plaice and sole in the Dutch shrimp fishery came in 1967 close to a solution through the development of the prototype of a rotating washing-sieve to replace the obsolete shaking sieve, an apparatus highly destructive for flatfish. From this new washing-sieve undersized shrimps and juvenile flatfish swim overboard through a wide tube, practically undamaged.
3. Catch forecast. A forecast of the tonnage of consumption shrimps to be landed in October, based on sea-water temperatures in January and February came very close to the real figures. The total landings of consumption shrimps was in 1967 about the same as that in 1966 (7.4 million kg). The further decrease in the landing of undersized shrimps (from 5.4 million kg in 1966 to 4.5 million kg in 1967) in combination with the effects of efforts to put the small shrimps back in sea alive, contributed noticeably to the result of 1967.

Norway

(K.R. Gundersen)

Cancer pagurus

Tagging experiments on Cancer pagurus, using the Norwegian tagging method, were expanded during 1967. In the Hjeltefjord area 1,251 tagged crabs were released and 700 crabs were tagged and released in More and Romsdal, north of Bergen.

131 crabs tagged in 1966 and earlier, recaptured during 1967 and brought to the Institute alive were released again at Nordnes in the Byfjord.

Homarus vulgaris

Tagging experiments on lobster in the field and in aquarium were continued and fishing experiments with different types of pots were carried out in the neighbourhood of Bergen.

Poland

(L. Zmudziński)

Observations were made on crustacea on the cruise of the research vessel M.V. "Wieczno" to the W. African Shelf waters, between 7°30'N and 23°00'N from 12th June to 5th September and on commercial vessels fishing in that region from October to December 1967.

Material relating to the occurrence of shrimps (Caridae, Penaeidae) spiny lobsters (Palinurus, Panulirus) and crabs (Brachyura) was collected. Special attention was given to shrimps, for which species composition, length, weight and sex data were obtained.

Portugal

(H. Vilela)

Prawns

Studies have been made on the biology and fishing of Penaeidae from the Portuguese and West African coasts landed in Portugal, especially Penaeus duorarum and Parapenaeus longirostris.

Crawfish

Studies have been made on the biology, fishing and live storage of crawfish (Panulirus and Palinurus) from Cape Verde Islands and the Azores.

Sweden

(B.I. Dybern)

Pandalus borealis

Continued information on the commercial prawn fishery has been obtained by the aid of about 20 fishing boats giving daily reports of prawn and fish catches from different areas. The prawn fishery is now slowly recovering from the bad state in 1966 and the first part of 1967, but, especially in the eastern Skagerrak, the catches are still relatively small.

The experimental trawling with different kinds of trawls has been continued. This time the catches per hour with long-armed cotton trawls and different sizes of the Vinge-trawl were compared. The results are not yet worked up.

Nephrops norvegicus

The diurnal trawling carried out over several years has been completed and the material is now to be published. A large-scale trawling experiment has been started in which all boats on two fishing grounds near the coast give detailed reports of their fishery day for day, both concerning Nephrops and fish catches.

Cancer pagurus

Studies of the distribution and behaviour of crabs have been continued by skin-diving and aquarium studies of their digging behaviour have been made.

Homarus vulgaris

The recording of the catches of lobsters by various kinds of fishermen has been continued. The catches from the commercial fishery are still decreasing. Continued tagging experiments in three different areas show very small or no migration of lobsters.

Skin-diving investigations concerning the distribution on different bottoms and the behaviour of lobsters have been carried out along the whole distribution area. Winter diving has revealed that lobsters are lying more or less stiff under stones during the coldest part of the year. There is no evidence of an offshore-inshore movement during different parts of the year.

United Kingdom

1. England & Wales

(A.C. Simpson)

Pandalus borealis

A survey of the Pandalus population in the Farne Deepes showed that while there were substantial numbers of prawns in the area the proportion of larger ones was less than in more northern areas.

Palaemon serratus

Good progress has been made with the artificial rearing of this species. Experiments have studied optimum densities of larvae and post-larvae (40-200 per litre) for rearing in 75 litre vessels using Artemia as food. Best growth and survival of juveniles have been obtained with mixed foods (i.e. mussel and shrimp) and temperatures between 20°C and 24°C. Survival of juveniles exceeding 60% has been obtained over a 138 day period for lots of 500 prawns kept in 4ft x 4ft x 6ins wooden tanks out of doors.

Nephrops norvegicus

A joint investigation with the Dublin (Ireland) laboratory was made to study the absolute abundance of Nephrops in the Irish Sea by marking and releasing several thousand Nephrops in a limited area over which fishing was subsequently done.

Cancer pagurus

The investigation of the crabs off the Yorkshire coast has now been completed but routine data on catch and effort will be continued for this area and the Norfolk coast. An investigation of the crab stocks on the south coast of England has now been started and preliminary observations show many marked differences between this area and Yorkshire, covering such matters as time of moulting and spawning, maximum sizes of males and meat yields.

Homarus vulgaris

The population study covering the Yorkshire and Northumberland coasts has been continued and included tagging experiments in both areas. Size composition observations off North Wales showed that there has been a slight decrease in mean size of lobsters in the catches compared with similar observations in 1954/55 when the fishing intensity was rather less.

Experiments have been made on the oxygen consumption of lobsters, during storage under commercial conditions and experiments on food consumption in relation to temperature gave values of 0.4 g, 0.8 g wet weight of mussel tissue per day per 100 g body weight at temperatures of 6°C, 14°C and 23.5°C respectively.

Palinurus vulgaris

The tagging programme started in 1966 has been continued and 252 crawfish were marked during 1967 with plastic daggers between the tail segments and small Petersen tags attached to the base of an antenna. Only 6% of the crawfish

marked in 1966 were recaptured during the following twelve months and none showed substantial movements.

Size-composition observations of crawfish caught by potting and commercial divers have been continued and information on fishing effort collected.

2. Scotland

(H.J. Thomas)

Crangon crangon, Pandalus bonnierii

Collection of catch/effort data for the Crangon fishery off the south-west of Scotland have been maintained. Research vessel cruises have investigated the distribution, abundance and catch composition of Pandalus bonnierii.

Nephrops norvegicus

The main Norway lobster grounds were sampled by research vessel in July. On the west coast grounds the average size of male Norway lobster has risen slightly whilst on the east coast grounds it is markedly less than previously. In the Firth of Forth area the commercial catches are exceptionally high so that the lower average size may well result from very good recruitment to the catchable stocks. Monthly measurements on board commercial vessels have been maintained in the Firth of Forth area. Further studies have been made in the aquarium of egg development and feeding rates.

Cancer pagurus

Routine sampling of the catch of edible crabs and the collection of catch/effort data have been maintained. Further returns from tagging experiments undertaken in 1966 indicate that the increase in shell breadth at moulting ranged from 9.4 to 33.8%. Movements conformed to the normal pattern of moulting females moving northwards and males moving little.

Homarus vulgaris

Investigations into the Scottish lobster stocks have been continued during 1967. The Laboratory has collected data from fishery observers throughout the year, including catch per hundred trap hauls, covering all the main fishing areas. In addition, length-composition data of the commercial catch have been maintained. Despite the fact that there has been some increase in catch-per-unit effort on the Scottish east coast, the mean average size of male lobster landed remains about 89 mm carapace length. Elsewhere around Scotland the average size is around 100 mm carapace length. Tagging experiments were undertaken off the east coast, where 930 tagged lobsters were released, and around Orkney, where 754 lobsters were released. In the latter area, monthly observations on the composition of the commercial catch have been maintained. In conjunction with the information on catch effort, the data suggest a somewhat better recruitment to the stock of marketable sized lobsters in July-August 1967 as compared with recent previous years.